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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/724,062	12/01/2003	Takuya Hamada	HAMA3008/EM	1728

23364 7590 10/30/2006

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EXAMINER
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THOMPSON, CAMIE S

ART UNIT	PAPER NUMBER
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1774

DATE MAILED: 10/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/724,062	<b>Applicant(s)</b> HAMADA ET AL.	
	<b>Examiner</b> Camie S. Thompson	<b>Art Unit</b> 1774	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on Amendment filed August 11, 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 10-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 10-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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### DETAILED ACTION

1. Applicant's amendment and accompanying remarks filed August 11, 2006 are acknowledged.
2. Examiner acknowledges amended claims 10 and 17.

### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 10 and 13-17 are rejected under 35 U.S.C. 102(e) as being anticipated by  
Komatsu et al., U.S. Pre-Grant Publication 2003/0071560.

Komatsu discloses a field emission display that has a structure with a plane-shaped field emission type electron source mounted on a rear plane of enclosed a vacuum box and phosphor layers (see paragraph 0003). Paragraph 0009 of the reference discloses that the phosphor layer comprises a mixture of main phosphors and small particle phosphors. Reference claim 19 discloses that the main phosphors are oxide system phosphors such as  $\text{SrTiO}_3$  and that the small particle phosphors are sulfide system phosphors such as  $\text{ZnS}:\text{Cu},\text{Au}$  (see paragraphs 0014-0016). It is disclosed in paragraph 0018 that the phosphor layer is formed by mixing the small particle

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phosphors into the main phosphors in a range larger than or equal to 10-weight% and also smaller than, or equal to 40-weight %.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kingsley et al., U.S. Patent Number 3,664,862.

Kingsley discloses a multi-component phosphor comprising ZnS and is activated by copper silver or gold and co-activated aluminum and a red emitting phosphor such as yttrium vanadate (see column 4, lines 1-68). Kingsley does not disclose the mixing ratio of the phosphors.

However, this is an optimizable feature. The amount of each phosphor in the mixture affects the efficiency of the phosphor. Discovery of optimum values of a result effective variable involves only routine skill in the art *in re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Therefore, it would have been obvious to one of ordinary skill in the art to have the mixing ratio of the green phosphor is about 5 to about 50% weight in order to have a phosphor mixture that will luminesce at low voltages and will continue to luminesce with high efficiency.

7. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komatsu et al., U.S. Pre Grant Publication 2003/0071560 in view of Kingsley et al., U.S. Patent Number 3,664,862.

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Komatsu discloses a field emission display that has a structure with a plane-shaped field emission type electron source mounted on a rear plane of enclosed a vacuum box and phosphor layers (see paragraph 0003). Paragraph 0009 of the reference discloses that the phosphor layer comprises a mixture of main phosphors and small particle phosphors. Reference claim 19 discloses that the main phosphors are oxide system phosphors such as  $\text{SrTiO}_3$  and that the small particle phosphors are sulfide system phosphors such as  $\text{ZnS}:\text{Cu},\text{Au}$  (see paragraphs 0014-0016). It is disclosed in paragraph 0018 that the phosphor layer is formed by mixing the small particle phosphors into the main phosphors in a range larger than or equal to 10-weight% and also smaller than, or equal to 40-weight %. Komatsu does not disclose the  $\text{ZnS}$  phosphor having Al as a co-activator. Kingsley discloses a multi-component phosphor comprising  $\text{ZnS}$  and is activated by copper silver or gold and co-activated aluminum and a red emitting phosphor such as yttrium vanadate (see column 4, lines 1-68). The use of aluminum as a co-activator affects the efficiency of the phosphor. Therefore, it would have been obvious to one of ordinary skill in the art to use aluminum as a co-activator to ensure that the phosphor mixture has increased luminescence due to its efficiency.

### ***Response to Arguments***

8. Applicant's arguments filed August 11, 2006 have been fully considered but they are not persuasive. Applicant argues that the Komatsu reference does not disclose mixing red phosphors with green phosphors. The Komatsu reference does disclose mixing oxide system phosphors and sulfide system phosphors in reference claim 19. Oxide system phosphors include


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SrTiO<sub>3</sub>:Pr (a red phosphor) and sulfide system phosphors include ZnS:Cu,Au (green phosphor).

Reference claim 19 reads on the instant claims. Therefore, the rejection of the claims under Komatsu is maintained.

Any inquiry concerning this communication or earlier communication from the examiner should be directed to Camie S. Thompson whose telephone number is (571) 272-1530. The examiner can normally be reached on Monday through Friday from 7:30 am to 4:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rena L Dye, can be reached at (571) 272-3186. The fax phone number for the Group is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
RENA DYE  
SUPERVISORY PATENT EXAMINER  
Art Unit 1774  
12/27/07